

App. No. 09/823,405
Amendment dated September 23, 2004
Reply to Office Action of June 24, 2004

REMARKS/ARGUMENTS

Claims 1-20 are currently pending. Claims 17 - 20 are allowed, and claims 5 - 7 and 9 - 11, and 13-16 are objected to but indicated as containing allowable subject matter. Claims 1 and 13 are objected to for various informalities. Claims 1 and 8 are rejected under 35 USC § 102 (e), while claims 2 - 4 and 12 are rejected under 35 USC § 103 (a). Claims 1, 5, 7, 8, 9 and 13 are amended. No new matter has been entered.

Objections to the Claims

Claims 1 and 13 are objected to as having various informalities and typographical errors. Claims 1 and 13 have been amended to correct for the minor infelicities. Applicants submit that the objections are overcome and notice to that effect is requested.

Allowable Subject Matter

Claims 17 - 20 are allowed.

Claims 5 - 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 6-7 depend from claim 5. Claim 5 has been rewritten in independent form. Claim 7 has been amended to correct for a minor infelicity that was identified by the Applicants. Claims 5 - 7 are now believed to be in proper form for allowance and notice to that effect is earnestly solicited.

Claims 9 - 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim

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and any intervening claims. Claims 10 - 11 depend from claim 9. Claim 9 has been rewritten in independent form. Claims 9 - 11 are now believed to be in proper form for allowance and notice to that effect is earnestly solicited.

Claims 13 - 16 would also be allowable if rewritten or amended to overcome various objections. Claims 14 - 16 depend from claim 13. Claim 13 has been amended as requested by the Examiner. Claims 13 - 16 are now believed to be in proper form for allowance and notice to that effect is respectfully requested.

Claims Rejected under 35 USC § 102 (e)

Claims 1 and 8 are rejected under 35 USC § 102 (e) as being anticipated by U.S. Patent No. 6,232,802 to Chang et al. Claim 8 depends from claim 1. The rejection of claim 1 under 35 USC § 102 (e) is believed to be overcome by amendment and traversal for the reasons stated below.

Claim 1 as currently amended recites limitations that are not taught nor suggested by any of the cited prior art references. The current amendments to claim 1 do not change the scope of the invention and are for clarification purposes to further illustrate the differences between applicants' claimed invention and the references cited in the office action.

Claim 1, as amended, recites:

"a timing delay circuit arranged to produce at least two strobe signals in response to the input signal such that the at least two strobe signals each have a corresponding pulse width that are no greater than the pulse-width associated with the input signal."

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None of the cited references, including the Chang reference (US Patent No. 6,232,802) teaches or suggests that the timing delay circuit is arranged to produce at least two strobe signals. The office action relies upon FIG. 6 of the Chang reference for support in generating strobe signals. The operation of the timing window generator described with respect to FIG. 6 is well understood as a pulse generator circuit that produces a single asynchronous pulse. Moreover, the circuit illustrated by FIG. 6 of Chang is incapable of producing more than a single pulse in response to the input signal such that the "at least two strobe signals" limitation cannot be satisfied. For instance, the timing signal of FIG. 6 corresponds to **one and only one pulse** that is generated in response to a low to high transition of input signal 210, while a high-to-low transition on input signal 210 does not initiate any additional pulses.

The operation of the timing window generator described with respect to FIG. 6 is well understood as a pulse generator circuit that produces a single pulse. The circuit illustrated by FIG. 6 of Chang is **only capable of producing a single pulse** in response to the input signal such that the "at least two strobe signals" limitation of Applicants' claim 1 cannot be satisfied. For instance, the timing window for Chang is a single pulse (see FIG. 2 and 3A) that is generated in response to a low to high transition of input signal 210, while a high-to-low transition on input signal 210 does not initiate an additional pulse.

Claim 1 also recites:

"**a comparator circuit arranged to produce a comparator output signal in response to a comparison between the input signal and a reference level signal**".

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The Chang reference (US Patent No. 6,232,802) neither teaches nor suggests that the comparator circuit compares the input signal to a reference level signal as is understood and appreciated by those of ordinary skill in the art. The office action relies upon input data 210 ands output voltage VO with respect to FIG. 2 of the Chang reference, namely matching the output voltage of the charge pump circuit (240) to the reference level signal of Applicants' claims. FIG. 2 of the Chang reference is a closed loop circuit that is arranged to adjust the output voltage of the charge pump (VO) until the output voltage is matched to a sampled peak level of the input data (210). Since the operation of the control loop changes the output voltage (VO), the output voltage itself does not operate as a reference level as is described and claimed in Applicants' claim 1.

Amended claim 1 further recites:

"a sampling logic arranged to sample at least two data points within a sampling window in response to the at least two strobe signals ... such that the at least two sampled data points correspond to at least two samples from the comparator output signal over the time period associated with the pulse-width of the input signal".

None of the cited references, including the Chang reference (US Patent No. 6,232,802), teaches or suggests that "two sampled data points" that are sampled from the comparator output signal "over the time period associated with the pulse-width of the input signal." The office action relies upon the smart timing window and the sample and block circuits of FIGS. 2 and 7 of the Chang reference for support. FIG. 2 of the Chang reference is a closed loop circuit that is arranged to adjust the output voltage of the charge pump (VO) by asserting a single pulse (either high or low) to one of the current sources in the charge pump. The Chang reference does not

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even sample the output of the comparator, as will be described below with reference to FIG. 7 of Chang.

A single pulse is generated as control signal 300, which corresponds to the smart timing window signal 235. Transmission gates 705 and 710 are activated by the control signal such that the output from the comparator (through an inverter) is directly coupled to the gate of transistors 735 and 740. Since transistors 735 and 740 are opposite types, only one of those transistors will be activated and current I_{OUT} will either source from transistor 735 or sink through transistor 740. Since the output of comparator 205 is coupled through the inverter to the transistor gates, there is no need to sample the comparator output at all. Sampling is known and understood in the art as requiring some sort of memory element, e.g. a storage capacitor or a flip-flop circuit that is periodically activated to "sample" a point of data for further evaluation. The Chang reference fails to teach any storage element that samples any particular point as is claimed in Applicants' claim 1. Furthermore, Chang does not illustrate any discrete sampling points from the output of the comparator as is described in Applicants' claim 1, and instead there is a defined window of continuously coupling of the output of the comparator to the charge pump control elements which correspond to transistors 735 and 740. As such, the cited references do not teach sampling, nor do they teach the sampling of two points within the pulse width of the input signal as recited in Applicants' claim 1.

Since none of the cited reference teaches or suggests all of the limitations of Applicants' amended claim 1, it is respectfully submitted that claim 1 is in proper form for allowance. Claim 8 depends from claim 1 and should be allowable for that reason as well as any additional

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limitations recited therein. The rejection of claims 1 and 8 under 35 USC § 102 (e) is believed to be overcome for the reasons stated above, and notice to that effect is respectfully requested.

Claims Rejected under 35 USC § 103 (a)

Claims 2 and 4 are rejected under 35 USC § 103 (a) as being unpatentable over US Patent No. 6,232,802 to Chang et al., in view of US Patent No. 6,448,821 to Sakurai. Claim 3 is rejected under 35 USC § 103 (a) as being unpatentable over US Patent No. 6,232,802 to Chang et al. and US Patent No. 6,448,812 to Sakuarai in view of US Patent No. 6,218,823 to Keeth. Claim 12 is rejected under 35 USC § 103 (a) as being unpatentable over US Patent No. 6,232,802 to Chang et al.

In order to maintain a rejection under 35 USC § 103 (a), there must be some motivation or teaching in the principal reference to make the claimed combination. Moreover, all of the elements of the claimed invention must be found in the prior art references, without the use of hindsight reconstruction. Claims 2 - 4 depend upon and further limit claim 1, which is proposed to be allowable for the reasons stated above. Claims 2 - 4 should also be allowable for that reason as well as any additional limitations they recite.

Nothing in the Chang reference suggests or teaches the use of differential signals in any regard. In fact, the charge pump circuit illustrated in the Chang reference provides a current output which is integrated on a capacitor, and has no need of a differential signal. The Sakurai reference merely teaches a differential comparator without any suggestions or motivations to

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adapt it for use in the Chang circuits. It is only through the use of hindsight reconstruction that the elements found in Applicants' claims 1 and 4 that such a combination is accomplished.

Similarly, the Chang and Sakurai references do not teach or suggest the use of "top" and "bottom" peak level signals as is taught by Applicants' claim 3. The office action relies upon the combination of the Chang and Sakurai references in view of the Keeth reference to create the combination found in Applicants' claim 3. None of the references provide any guidance as to how the combination of those references are to be made. For example, the Keeth reference only teaches a voltage regulator circuit, while the Chang reference teaches only a charge pump system, and the Sakurai reference teaches only a comparator circuit. There is no teaching in those references as to how the combination is to be made, and thus there is no reasonable expectation or predictability of success in making the combination. It is once again through the use of impermissible hindsight reconstruction that the elements found in Applicants' claim 3 are found.

The office action relies upon the Chang reference in the rejection of claim 12, with consideration that "equalizer circuits and data slicer circuits are well known in the art". The mere fact that circuit functions are well known in the art does not in itself result in anticipation unless there is a teaching, suggestion, or motivation that is found in the principal reference to pursue and adapt those circuits for use. Where is the guidance as to where in this charge-pump system the circuits are to be used ? The Applicants' do hereby seasonably challenge that it would have been obvious to adapt the Chang reference to use an equalizer circuit and a data slicer

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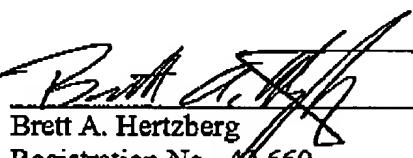
circuit in a manner that is consistent with Applicants' claim 12. It is respectfully requested that a reference be provided or the rejection under 35 USC 103(a) be withdrawn.

For the reasons stated above, it is believed that the rejection of claims 2-4 and 12 under 35 USC § 103 (a) is overcome and notice to that effect is respectfully requested.

In view of the foregoing amendments and remarks, all pending claims are believed to be allowable and the application is in condition for allowance. Therefore, a Notice of Allowance is respectfully requested. Should the Examiner have any further issues regarding this application, the Examiner is requested to contact the undersigned attorney for the applicant at the telephone number provided below.

Respectfully submitted,

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